CAVITY BACKED SLOT ANTENNA WITH SUBSTRATE INTEGRATED WAVEGUIDE (SIW)

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ABSTRACT

A low profile planar cavity backed slot antenna with Subtrate Integrated Waveguides (SIW) operating at 4.78GHz for wireless applications has been described in this paper. This antenna is completely designed at a single substrate which is a FR-4 with dielectric constant, ε_r= 4.4 and 1.6mm thickness. The design consists of a SIW antenna with patch, feeding and cavity backed. Grounded co-planar waveguide (GCPW) is used as feeding element to stimulate the SIW cavity to replace microstrip line feeding. The proposed antenna have been designed, simulated and measured using CST Microwave Studio Software and Vector Network Analyze (VNA) respectively. Antenna parameters result such as return loss (S_{11}), radiation pattern, directivity, gain and VSWR are investigated, compared and analyzed. The tuning length of slot and GCPW length have also been analyzed.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Antenna is a device has the conductor system that can transmit and receive signals such as microwave, radio or satellite signals [1]. It acts as a transitional structure between free space and guiding device. The signals of radio or electromagnetic waves transmitted or received by antenna using the space transmission as their channel without using physical cable such as coaxial, optical glass or any transmission medium channel [2]. The function of an antenna transceiver which is transmits signals or receives signals.

The rapidly development in wireless communication, there are needed the reliable, compact size, and low cost in designing of the devices. Rectangular waveguide components mostly used in microwave design and millimeters wave system implemented with the slot antenna at the high frequency. The diversity concepts and various shapes of slot have been applied in rectangular waveguide to create the better performance of the devices. The one of the concepts is conventional metallic waveguide cavity backed slot antenna (CBSA). The conventional metallic waveguide (CBSA) have widely been used as it good radiation performance. Conventional metallic waveguide (CBSA) is not suitable for some application because their bulky volume and producing the leakage loss. Besides, conventional metallic waveguide (CBSA) difficult to design because it